Dec. 6, 1949 W. R. BURTIS 2,490,413

SELF-SERVICE REFRIGERATED DISPLAY CASE

Filed Nov. 30, 1946

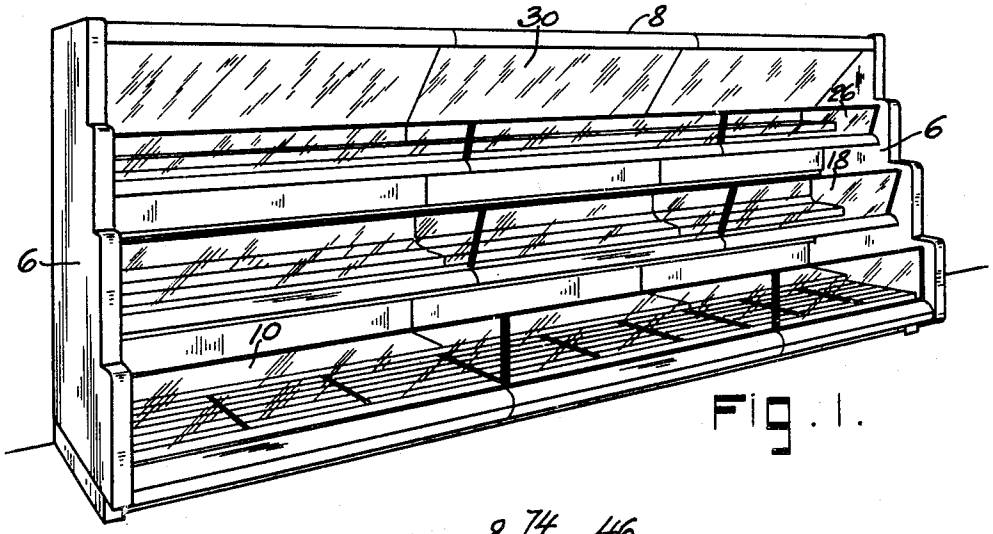


Fig. 1.

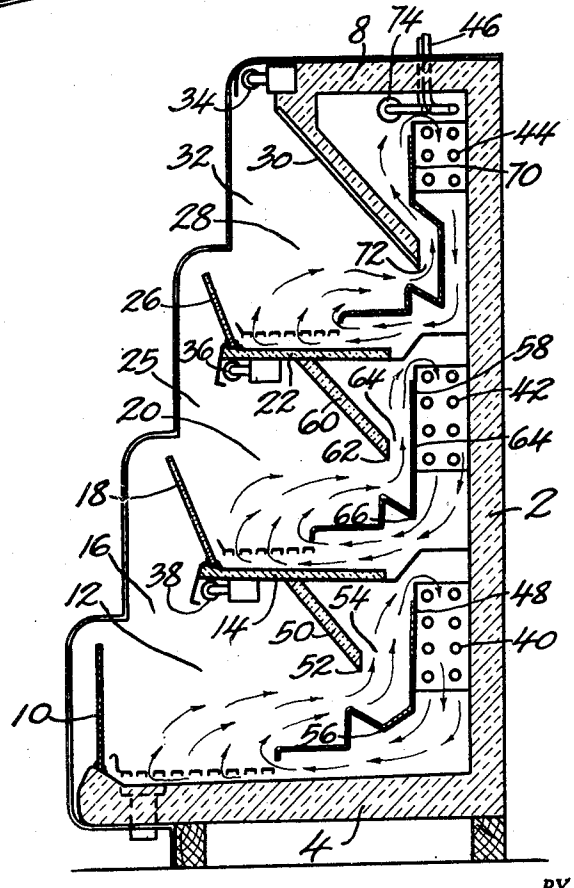


Fig. 2.

INVENTOR.
WINFIELD R. BURTIS
BY Albert Sperry
ATTORNEY

Patented Dec. 6, 1949 2,490,413

UNITED STATES PATENT OFFICE

2,490,413

SELF-SERVICE REFRIGERATED DISPLAY CASE

Winfield R. Burtis, Trenton, N. J., assignor to C. V. Hill & Company, Inc., Trenton, N. J., a corporation of New Jersey

Application November 30, 1946, Serial No. 713,232

4 Claims. (Cl. 62—89.5)

1

This invention relates to refrigerated self service display cases and particularly to constructions in which the capacity of the case is increased and improved control of the temperature in the display case is provided.

The preservation and display of products for self service by customers has many advantages and as shown and described in the patent to Caulk et al. No. 2,382,937 articles may be refrigerated in display spaces which are open at the top for self service without giving rise to condensation of moisture on the products. However, the depth of such display spaces is generally limited and therefore the capacity of open type self service display cases is relatively small as compared with the floor space which the case occupies. Moreover, it is sometimes desirable to maintain articles being displayed at different temperatures whereas space does not permit the use of two or more cases for this purpose.

In accordance with the present invention these limitations of prior constructions are overcome by providing a self service refrigerated display case with a plurality of display spaces arranged one above the other in a single case. With this arrangement it is also possible to provide each space with a refrigerating coil and to control the temperature maintained in each display space so as to assure the most satisfactory display and preservation of the products therein.

One of the problems encountered in the construction and operation of refrigerated display cases wherein display spaces are arranged one above the other resulted from the necessity to render the spaces readily accessible and to overcome the tendency for warm moist air from the atmosphere above the display space to be trapped beneath an overhanging shelf or display space in such a way as to cause moisture carried by such air from condensing on the articles being displayed. However, these problems have been overcome by the use of novel arrangements of elements whereby access to the display spaces is substantially unobstructed and the deposition of moisture on the articles in the display spaces is reduced or eliminated.

One of the objects of the present invention is to provide a novel type of refrigerated display case having a plurality of open, self service display spaces located one above the other.

Another object of the invention is to provide a refrigerated self service display case with display spaces which may be maintained at different temperatures.

2

A further object of the present invention is to provide a refrigerated self service display case wherein the condensation of moisture on the products being displayed is substantially eliminated.

These and other objects and features of the present invention will appear from the following description thereof in which reference is made to the figures of the accompanying drawing.

In the drawing:

Fig. 1 is a perspective of a typical display case embodying the present invention; and

Fig. 2 is a vertical sectional view through the construction illustrated in Fig. 1.

In that form of the invention illustrated in the figures of the drawing the refrigerated self service display case is provided with an insulated rear wall 2, an insulated base 4, insulated end walls 6 and an insulated top 8. The base 4 is provided at its front edge with an upwardly extending front wall 10 which extends between the end walls 6 and cooperates therewith to provide a lower display space 12. The front wall 10 preferably consists of multiple glass panes that afford insulation for the display space while permitting articles therein to be readily seen. An insulated shelf 14 is located above the display space 12 and projects forward from the rear wall 2 to a point above and spaced inward from the front wall 10 of the lower display space so as to provide a free access opening 16 at the front and top of the lower display space 12.

The shelf 14 is provided with an insulating but transparent front wall 18 which projects upward from the forward edge of the shelf and extends between the end walls 6 so as to provide an intermediate display space 20 above the lower display space 12. A second insulated shelf 22 is located above the shelf 14 and projects forward from the rear wall 2 to a point above and spaced inward from the front wall 18 of the shelf 14 thus providing an access opening 25 at the front and top of the intermediate display space 20.

An insulating and transparent front wall 26 extends upward from adjacent the front edge of the insulated shelf 22 and cooperates with the end walls of the case to provide an upper display space 28. A mirror 30 is inclined downwardly and rearwardly from the front edge of the insulated top 8 above the display space 28 and thus providing an access opening 32 at the front and top of the upper display space. The mirror 30 also renders the case more attractive in appearance and aids children or short persons to

see the articles on display in the top display space more readily.

A fluorescent light or other source of illumination 34 is mounted on the front edge of the top 8 and serves to illuminate the articles in the display space 28. Similar lights 36 and 38 are mounted beneath the shelves 22 and 14 respectively near the front thereof for illuminating the intermediate and lower display spaces so that articles therein may be seen readily and attractively displayed. By positioning these lights below and at the front of each shelf and at the front of the overhanging top 8 the heat developed by the lights causes air above the display space and below the front of each shelf to flow outward and upward so as to oppose and limit the flow of warm moist air downward into contact with the articles on display. In this way, the lights serve to cause the circulation of air within the display space to be confined largely to recirculation of previously refrigerated air and the deposition of moisture on the coils and articles is reduced.

With this construction three display spaces 12, 20 and 28 are provided and these spaces are arranged one above the other providing a relatively large total capacity for the display and preservation of articles in a single case. At the same time the stepped arrangement of the shelves 14 and 22 affords ready access to each of the display spaces at the front and top thereof and the articles in all three display spaces so that they can be easily removed by the customers.

Each of the display spaces is provided with a refrigerating element in the form of a coil through which refrigerant is circulated. The coil associated with the display space 12 is indicated at 40; the coil associated with display space 20 is indicated at 42, and the coil associated with display space 28 is indicated at 44. Each of these coils is provided with heat conducting fins and is located adjacent the rear wall 2 of the display case. The coils are supplied with refrigerant through lines such as those indicated generally at 46.

The coil 40 associated with the lower display space 12 is positioned adjacent and beneath the shelf 14 and is provided with a baffle 48 which is spaced at its upper edge from the shelf 14 so as to permit air to flow over said edge into contact with the coil 40. The lower edge of baffle 48 is spaced from the bottom 4 of the case so as to form an air outlet through which air cooled by the coil and dried by the deposition of moisture thereon may flow forward in the display space 12 and upward therein about the articles therein.

A second baffle 50 is carried by the shelf 14 and extends downward and rearward therefrom in spaced relation to the baffle 48. The lower edge 52 of the baffle 50 is positioned at or below the level as the upper edge of the front wall 10 of the display space 12 so that baffles 48 and 50 cooperate to provide an air passage 54 having an inlet located adjacent the upper portion of the display space 12. By this construction air is forced upward within the display space 12 by the downwardly flowing body of cooled and dried air from the coil 40 whereas the air which is adjacent the top of said space and which has risen in temperature by contact with the articles on display is drawn off from the top of the display space and returned to the coil 40.

The inclined position of the baffle 50 further serves to prevent pocketing of warm moist air from the atmosphere above the display space in the space beneath the overhanging shelf 14 and adjacent the coil 40. Such air instead contacts the relatively uncooled outer surface of baffle 50 and is directed upward toward the illuminating means 38. Any moisture condensing on the baffle 50 is conducted downward and rearward thereby so that it will fall into the drain gutter 56 and be conducted from the case and will not come into contact with the articles on display.

The coil 42 associated with the intermediate display space 20 is similarly located adjacent but below the upper shelf 22 and is provided with a baffle 58 located adjacent the coil and having its upper and lower edges spaced from the shelves 22 and 14 respectively. An inclined baffle 60 extends downward and rearward from the shelf 22 and its lower edge 62 is located at or below the level of the upper edge of the front wall 18 of the display space 20. In this way the baffles 58 and 60 cooperate to form the air passage 64 and serve to establish a thermo siphon insuring the circulation of cooled and dry air upward in the display space 20 while the warmer air in said space and adjacent the top thereof is drawn off and returned to the coil. The display space 20 is also provided with a drain gutter 66 located below the lower edge 62 of baffle 60 to receive any moisture condensing on the baffle and running downward to its lower edge. The deposition of moisture on the articles being displayed and the pocketing of air so as to promote condensation is thus substantially reduced or eliminated.

The coil 44 for the upper display space 28 is located adjacent the insulated top 8 and is provided with a baffle 70 which is spaced at its upper edge from said top and spaced at its lower edge from the upper surface of shelf 22. The mirror 30 is insulated on its rear surface and cooperates with baffle 70 to form an air passage 72 through which air from adjacent the top of display space 28 flows to the coil 44. The air cooled by coil 44 deposits its moisture on the coil and fins and descends to the lower portion of the display space. The air then flows upward about the articles therein so as to maintain the articles in a cooled dry condition.

In the construction illustrated a single expansion valve 74 is located between the refrigerated line 46 and the upper coil 44. The refrigerant then passes from coil 44 to coil 42 and then to coil 40 and in its final run it passes back to coil 44. However, other arrangements of the coil and expansion valve may be employed. Furthermore, the size and position of the coils associated with the different display cases may be varied to produce and maintain the desired temperature in each display space. As shown the coil 44 associated with the upper display space is smaller than the coils 42 and 40 and is wholly located substantially above the level of the upper edge of the front wall 26 of the display space 28. The coil 42 associated with the intermediate display 20 has its lower portion substantially even with the upper edge of the front wall 18, whereas coil 40 is located partially above and partially below the upper edge of the front wall 10 of the lower display space 12.

Each arrangement of the coils with respect to the display space has characteristic advantages and in general the higher the coil the more rapid the circulation of air and the lower the temperature maintained within the display space. Such alternative arrangements, locations and sizes of the refrigerating coils and the differ-

ences in size of the display spaces renders it possible to maintain all three display spaces at substantially the same temperature or to maintain each display space at a different temperature independently of the other.

This flexibility in construction and operation of display cases embodying the present invention is typical of the numerous changes and modifications in the form, arrangement and method of operating such cases. In view thereof it should be understood that the particular construction shown in the drawing and herein described is intended to be illustrative only and is not intended to limit the scope of the invention.

I claim:

1. A refrigerated self service display case comprising means defining a plurality of vertically spaced display spaces each of which is closed about the bottom and sides and open at the top for access to customers, a refrigerating element for each display space operable to maintain the air in each space at a predetermined temperature independent of the temperature at which the air in a vertically adjacent display space is maintained, and heating means located adjacent the upper portion of each of said display spaces in position to produce a flow of air upward away from said spaces and in a direction to oppose the flow of unrefrigerated air downward into said display spaces from the exterior thereof.

2. A refrigerated self service display case comprising a bottom, a top and back and end walls, a plurality of vertically spaced shelves projecting from said back walls and each provided at its front edge with an upwardly extending front wall extending from one end wall to the other and cooperating therewith to provide a plurality of display spaces each of which is open at the top for access to customers, means for maintaining the air in each of said display spaces at a predetermined low temperature, and illuminating and heating means located adjacent the upper portion of each of said display spaces and positioned to illuminate articles in the display spaces and to produce a flow of air upward away from said spaces and in a direction to oppose the flow of unrefrigerated air downward into said display spaces from the exterior thereof.

3. A refrigerated self service display case comprising a bottom, a top and back and end walls, a plurality of vertically spaced insulated shelves projecting from said back wall and each provided at its front edge with an upwardly extending front wall extending from one end wall to the other and cooperating therewith to provide a plurality of separately insulated display spaces each of which is open at the top for access to customers, a refrigerating element for each display space having at least a part thereof located above the upper edge of the front wall of the space with which it is associated, a baffle extending downward from said top and a baffle extending downward from each shelf, the lower edges of said baffles being approximately level

with the upper edges of the front walls of the display spaces and other baffles cooperating therewith to provide an air circulating passage for each display space through which air will flow by gravity from the refrigerating element into the bottom of the display space and from that portion of the display space below the level of the upper edge of the front wall of the display space back to the refrigerating element, and illuminating and heating means located adjacent the upper portion of each of said display spaces and positioned to illuminate articles in the display spaces and to produce a flow of air upward away from said spaces and in a direction to oppose the flow of unrefrigerated air downward into said display spaces from the exterior thereof.

4. A refrigerated self service display case comprising a bottom, a top and back and end walls, a plurality of vertically spaced shelves projecting from said back wall and each provided at its front edge with an upwardly extending front wall extending from one end wall to the other and cooperating therewith to provide a plurality of display spaces each of which is open at the top for access to customers, a refrigerating element for each display space having at least a part thereof located above the upper edge of the front wall of the space with which it is associated, a baffle inclined downward and rearward from adjacent the front edge of said top to the level of the upper edge of the front wall of the uppermost display space, baffles inclined downward and rearward from adjacent the front edge of each shelf to the level of the upper edge of the front wall of the display space therebeneath and a baffle located adjacent each refrigerating element and cooperating with the first mentioned baffles to provide an air circulating passage for each display space through which air will flow by gravity from the refrigerating element into the bottom of the display space and from that portion of the display space below the upper edge of the front wall of the display space back to the refrigerating element, a drain gutter located beneath the lower edges of said baffles for receiving and removing liquid falling from said baffles, and illuminating and heating means located adjacent the upper portion of each of said display spaces and positioned to illuminate articles in the display spaces and to produce a flow of air upward away from said spaces and in a direction to oppose the flow of unrefrigerated air downward into said display spaces from the exterior thereof.

WINFIELD R. BURTIS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,083,442	Gardner	June 8, 1937
2,241,854	Hall	May 13, 1941
2,379,885	Davis	July 10, 1945